AMENDMENTS TO THE SPECIFICATION

Please delete the paragraph on page 3, lines 26 – 31, and insert the following:

A substantial improvement that makes ring-shaped and other perimeter slit-valves suitable and advantageous for ALD applications is described in U.S. ~~patent application~~ Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., by the inventor of this invention that provides seal and crevice protection during the ALD chemical dose steps, therefore making perimeter slit-valves suitable for Synchronously Modulated Flow-Draw ALD apparatus and method.

Please delete the paragraphs on page 4, lines 5 – 28, and insert the following:

In previous patent applications by the inventor of this invention, US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc., embodiments that helped solve some of the problems described above were disclosed. Systems, apparatuses, and methods in accordance with that invention provide Synchronous Modulation of Flow and Draw ("SMFD") in chemical processes, and in particular, in atomic layer deposition processes and systems. These patent applications are included here as references.

Atomic layer deposition ("ALD") is preferably practiced with the highest possible flow rate through the deposition chamber during purge, and with the lowest possible flow rate during dosage of chemicals. Accordingly, an efficient ALD system in accordance with US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc., is able to generate and accommodate

significant modulation of flow rates. Under steady-state conditions, the flow of process gas (either inert purge gas or chemical reactant gas) into a chamber, referred to herein as "flow", substantially matches the flow of gas out of a chamber, referred to herein as "draw".

An important aspect of an embodiment in accordance with the invention described in US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc., is that it resolves the trade-off in conventional ALD systems between the contradictory requirements of a high flow rate during a purge of the deposition chamber and of a low flow rate during chemical dosage. SMFD in accordance with that invention provides the ability to purge a process chamber at a low-pressure and a high purge-gas flow rate, and sequentially to conduct chemical dosage in the process chamber at a high-pressure and a low flow rate of chemical reactant gas, and to modulate pressures and gas flow rates with fast response times.

Please delete the paragraph on page 18, lines 1 – 4, and insert the following:

FIG. 1 depicts a flow diagram of a basic embodiment of a synchronously modulated flow-draw ("SMFD") ALD system 600 in accordance with the invention described in US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc., and the improvements that are disclosed in this application.

Please delete the paragraph on page 20, lines 19 – 23, and insert the following:

During typical ALD operation, apparatus 600 is switched essentially between two static modes, a purge mode ("purge") and a chemical-dosage mode ("dose"). Representative valve-settings of the two basic modes of operation are presented in Table 1. More teaching about the SMFD ALD apparatus and method is given in US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc.

Please delete the paragraph on page 20, line 26, through page 21, line 11, and insert the following:

FIGS. 2 present a schematic comparison between prior art flow versus time chart 300 presented in FIG. 2a and the inlet flow into an SMFD showerhead 104, chart 320 presented in FIG. 2b. Since typical SMFD timing is more than 5 times shorter, the time scale of the SMFD charts is divided by a factor of 5. FIG. 2c presents chart 340 which represents the complementary flow versus time into the DGIC 630 in synchronization with the inlet flow depicted in chart 320 (FIG. 2b). An ALD cycle comprised of first chemical dose 302, first purge 304, second chemical dose 306, and second purge 308 is conventionally carried under substantially constant flow conditions as illustrated in chart 300. In contrast, the inlet sequence 320 of first chemical dose 322, first purge 324, second chemical dose 326, and second purge 328 is carried under substantially modulated flow conditions. Complementary draw flow presented in chart 340 maintains the pressure during chemical dose steps with draw flow 342 and 344 during chemical dose steps 322 and 326, respectively. Note the transient stages 321 and 325 at the leading edge of chemical dose 322 and 326, respectively. These booster high-flow leading edge transients are further taught in US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092

issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc.

Please delete the paragraph on page 23, line 17, through page 24, line 6, and insert the following:

Draw-gas inlet 830 provides serial fluidic communication between a draw-gas manifold (not shown) and a draw gas plenum 832. One skilled in the art can implement draw gas plenum 832 in many different configurations, and the embodiment shown in FIGS. 3 and 4 is a non-exclusive example. As depicted in FIG. 3, draw-gas inlet 830 is in fluidic communication with radial plenum space 832, which further communicates with DGIC 820 through a radial array of nozzles (not shown), which are appropriately spaced and designed to unify the radial flow distribution of gas into DGIC 820 and direct draw gas into the upstream portion of DGIC 820. Those who are skilled in the art can appreciate the necessity to adequately unify the flow of draw gas and reactive abatement gas to conform to the symmetry of the deposition system. For example, the radial symmetry of the system is depicted in FIGS 3 and 4. Indeed, a draw control gas, introduced with a substantially non-uniform radial distribution, impacted the radial distribution of dosed chemicals as observed when ALD was tested with one of the dose steps kept under saturation conditions. While saturation properties of ALD reaction steps can overcome this effect, longer chemical doses are dictated that, in turn, extend the ALD cycle time and in many cases reducing the chemical utilization efficiency. As explained in US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc., and further below, the draw control gas, the DGIC and the SMFD method are crucial and instrumental in enabling the implementation of perimeter slit-valve to improve performance and reduce the size of the ALD chamber. In that

respect, the plenum and the DGIC protect the seals of the PSV and their respective crevices from a substantially damaging contact with the process chemicals.

Please delete the paragraph on page 24, lines 15 – 27, and insert the following:

During ALD processing, purge gas during a purge stage and chemical reactant gas during a dosage stage flow along a process-gas flow-path through reactor-vessel interior 808 in a downstream direction from showerhead inlet 809 through showerhead 201, deposition chamber 203, DGIC 820, and DC 208, in that order, and out of reactor vessel 800 through vacuum port 210. Similarly, draw gas introduced into DGIC 820 flows in a downstream direction from DGIC 820 into DC 208 and then exits through vacuum port 210. The terms "downstream" and "upstream" are used herein in their usual sense. It is a feature of embodiments in accordance with the invention that backflow of gases, that is, the flow of gases in an "upstream" direction, never occurs, as taught in US Patent Application No. 10/347575, now U.S. Patent No. 6,911,092 issued June 28, 2005, which is commonly assigned to Sundew Technologies, Inc., and PCT Application No. US03/01548, now PCT Publication No. WO 03/062490 published July 31, 2003, which is commonly assigned to Sundew Technologies, Inc. The term "upstream" is used in this specification, however, to designate the relative locations of components and parts of a system.